

MONTHLY JOURNAL OF
THE MUSHROOM GROWERS'
ASSOCIATION

MGA

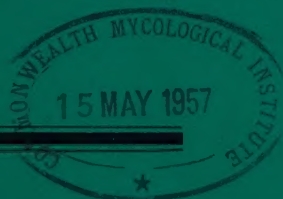
BULLETIN

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CONTENTS

	Page
Editorial	157
Santobrite for Sterilization of Trays : P. N. Heron, B.A. ...	158
HOW TO MAINTAIN A PROFITABLE MARKET : Dr. Robert Bull	165
Eire Farm Visit	168
Publicity Bags—First Half-Million	168
Last Month's Publicity Contributions	168
DIGEST	171
Publicity and Verse	174
Publicity Overseas—Pictures	177
New Type Container—Picture	178
American Short Course	178
Publicity Subscribers	179
Seen This ?	180



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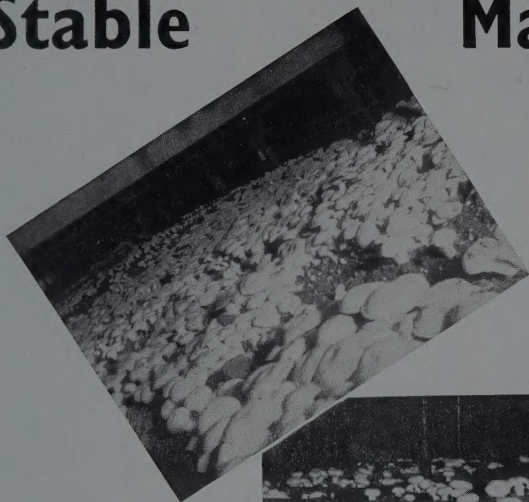
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EDITORIAL

STRAWS IN THE WIND

Growers everywhere agree that the basis of good mushroom growing is good composting, for a bad compost—and just how many people do not produce a good compost is anybody's guess—means that the battle is lost before it is even joined.

With straw as the main ingredient of mushroom composts the modern trend by plant breeders to produce varieties of corn, and wheat in particular, which is shorter, stiffer and less liable to "lodge" than the varieties in popular demand up to a few years ago, is of both interest and concern.

The advent of the combine harvester plus the decreasing use by the farmer of his own straw has added great momentum to the drive for shorter and more especially stiffer straw for this means easier work at harvest time when, as many of us have seen, straw is of so little value that many thousands of tons are burnt in the fields.

To the mushroom grower, straw remains the main key to a good, buoyant and reliable compost and inevitably this quick move to stiffer straw is bound to bring its problems, problems which will not be answered by a move to other cereal straws since they too are more stiff than ever before.

Those connected with farming forecast that well over half of the winter sown wheat in the United Kingdom and due to come to harvest this summer will be of one variety—Capelle—longish strawed by modern trends but hard and stiff. Much of this will find its way into mushroom compost and may well result in a brittle half-baked product which will puzzle the grower and possibly depress yields.

As one prominent grower who first raised the matter put it, "It could quite easily lead to a re-assessment of the whole composting process." Maybe it isn't quite as serious as that, but certainly it is a matter which should be looked into most carefully. The problem—if problem it is—will not be solved by pretending it doesn't exist. WRA

Some recent trials with

*** SANTOBRITE** (TECHNICAL SODIUM
PENTACHLOROPHENATE)
for

STERILISATION OF MUSHROOM TRAYS

P. N. HERON, B.A. (Cantab.), Monsanto Chemicals Limited

The trials were designed to investigate the possibility of using Santobrite as a sterilising agent for mushroom trays. Extensive tests carried out, both in the laboratory and in conjunction with a number of commercial mushroom growing plants, have shown that a 2% aqueous solution of this chemical provides a very effective means of sterilising trays between growing periods. The treatment keeps the trays in a comparatively clean condition, free from mushroom disease fungi and adhering mycelium. It has also been found to give excellent control over Cecid larvae attack on mushrooms. Tables are given showing the increase in crop yields from less than 1 lb./sq. ft. before the use of Santobrite to nearly $1\frac{1}{2}$ lb./sq. ft. over the same cropping period after the trays had been treated with Santobrite solution. Precautions to be observed during the subsequent handling of trays so treated are noted.

Introduction

Since mushrooms are themselves fungi, it is only natural that the conditions of temperature and humidity appropriate for the cultivation of mushrooms are ideal for the growth of other species of fungus.

In the absence of an efficient sterilising process, mould growths on trays can develop and harbour fungal species that are harmful to mushrooms, and if allowed to spread may completely wipe out a crop. Quite apart from this, such mould attack can have a detrimental effect on the woodwork of which the trays are composed. These trials were carried out to investigate the effectiveness of a Santobrite solution dip treatment for the trays as a means of preventing the growth of such unwanted species of fungus on the woodwork.

Santobrite is an extremely active fungicide and it was therefore necessary to discover whether the presence of this material on the woodwork of the mushroom trays would have any deleterious effects on the mycelium or mushrooms subsequently grown in the trays. Trials at a mushroom farm were therefore initiated to determine (a) the concentration of Santobrite in the dipping solution required to control unwanted fungi, and (b) what concentration of Santobrite on the trays was permissible without causing damage to the mushrooms themselves, subsequently grown in the treated trays.

Determination of Safe Concentration for Dipping Trays

Santobrite is readily soluble in water and it was desired to determine the optimum concentration of this material in the solution so that the trays could be adequately treated merely by dipping them for a period of a few seconds. The tests were carried out by preparing solutions containing Santobrite at concentrations of 2%, 5% and 10%, and dipping a series of mushroom trays in each of these solutions.

The test trays were allowed to dry out thoroughly and were then filled with compost one week after dipping. Peak-heating was then carried out as usual and the trays were spawned in the normal way.

*Santobrite, which is manufactured in Great Britain by Monsanto Chemicals Ltd., is a Registered Trade Mark.

Inspections subsequently carried out during the cropping period revealed that the mushroom mycelium in all the treated trays remained in a healthy condition, and by the end of the cropping period it was apparent that the mushrooms had grown quite normally in all the test trays, including those dipped in the highest concentration of Santobrite solution. In parallel with these tests, one complete house was run filled with trays treated at the 2% level, and this house cropped fully up to normal. These results indicated that mushrooms were not likely to be affected by the presence of Santobrite on trays in which they were grown.

Cleanliness of Trays

All the Santobrite treated trays in the above tests remained very clean in appearance throughout the period they were in the growing houses, and showed a noticeable lack of unwanted mould growth on the woodwork. When the compost was tipped out of the trays it was noted that the test trays were in a remarkably clean condition as compared with those which had not received the Santobrite dipping treatment and the woodwork of the trays was free from adhering mushroom mycelium. Absorption of Santobrite from the treated woodwork into a thin layer of compost actually in direct contact with it prevented the mushroom mycelium from growing right up to the walls and bottoms of the trays by the formation of a thin barrier, $\frac{1}{8}$ " to $\frac{1}{4}$ " in thickness, between the woodwork of the trays and the bulk of the compost contained in them. In practice the fact that the mushroom mycelium does not grow in contact with the treated wood is of great value since the comparative cleanliness of the boxes considerably reduces the time normally spent on the cleaning and brushing out of the trays between growing periods.

Since the use of the lowest of the concentrations of Santobrite solution included in the above tests gave efficient control over fungal attack on the trays, and consequently prevented the establishment of unwanted fungi which might otherwise have caused damage to the mushroom crops, it was concluded that the most satisfactory treatment to recommend for the sterilisation of mushroom trays would be a 2 to 4 seconds dip in cold 2% Santobrite solution. When treating a batch of trays, the period of dipping can be limited to the speed at which the trays can be totally immersed in the solution and then taken out again, and it has been found that the quantity of 2% solution obtained by dissolving 10 lb. of Santobrite in 50 gallons of water is sufficient to dip approximately 350 trays (each 30" \times 18" \times 6").

Cecid Larvae Control

It has been reported by the Mushroom Growers' Association Executive Committee that Cecid larvae constitute a major threat to the mushroom industry. The Cecid larvae hatching out from eggs laid by the Cecid fly in cracks and crevices on mushroom trays can become a serious menace in growing houses, and, by attacking the mycelium and the growing mushrooms, cause considerable reduction in the crop yields obtained. Trials carried out at a mushroom growing plant where Cecid larvae attack was a major problem have revealed that treatment of the mushroom trays with Santobrite results in excellent control of

Cecid larvae infestation with consequent increases in mushroom crops obtained. Before using Santobrite a great deal of trouble was encountered from Cecid larvae in the growing houses at the plant concerned. A gradual build-up of the larvae during the cropping period would result in a diminution in the weights of successive flushes of mushrooms picked.

After treating the trays by a 2 to 4 seconds cold dip in 2% Santobrite solution, a marked improvement in the yields was observed. A comparison of the cumulative weights of mushrooms picked from the treated trays by the end of successive weeks throughout the cropping period showed that Cecid larvae build-up was significantly delayed, resulting in greater crop yields being obtained. It was reported that at the end of the cropping period preceded by dipping the trays in Santobrite solution "literally millions" of dead Cecid larvae were found on the treated wood of the emptied trays.

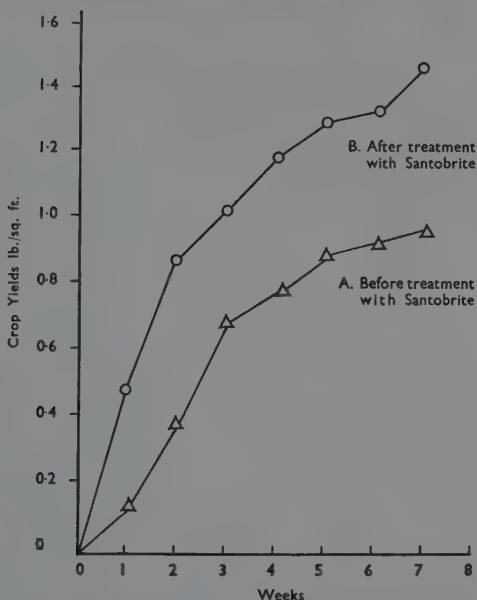
Before turning to the use of Santobrite for the sterilisation of his trays, this grower had been using a mixture of formaldehyde and cresylic acid for this purpose and was averaging a crop yield for the whole farm of about $\frac{1}{2}$ lb. per sq. ft. in a six-week cropping period. During the six weeks the best flushes were picked in the first three weeks, after which there was a falling-off in yields due to the Cecid larvae build-up. After using Santobrite solution for sterilising the trays excellent crops were obtained up to the end of the fourth and even fifth week, and the fall-off after this was less noticeable, average crop yields now being of the order of 1 lb. per sq. ft. or more. Table I shows the crop yields obtained from houses on this plant containing trays treated in various ways.

TABLE I

House Ref. No. and total area	Treatment of trays	Week in cropping period	Cumulative total weight of mushrooms picked by end of successive weeks (lb.)	Cumulative crop yields (lb./sq. ft.)
3 (2,368 sq. ft.)	Formaldehyde and cresylic acid	1	301	0.127
		2	877	0.370
		3	1,598	0.674
		4	1,806	0.761
		5	2,067	0.871
		6	2,163	0.913
		7	2,292	0.967
3 (2,368 sq. ft.)	First dip in 2% Santobrite solution	1	1,106	0.467
		2	2,022	0.850
		3	2,382	1.01
		4	2,800	1.18
		5	3,025	1.28
		6	3,159	1.33
		7	3,420	1.44
5 (3,960 sq. ft.)	Second dip in 2% Santobrite solution	1	1,336	0.337
		2	2,912	0.734
		3	3,772	0.951
		4	4,444	1.12
		5	5,046	1.27

Fig. I

Crop Yields from House No. 3 before and after treatment of Trays with Santobrite Solution



The results for house 3, before and after the use of Santobrite for the sterilisation of the trays, when plotted as graphs (Fig. I), show the marked effect which the use of Santobrite has had on the crop yields. The fall-off in yield from the trays after the third week, before the use of Santobrite, is markedly noticeable in Graph A compared with Graph B showing the crops obtained after the first Santobrite treatment.

Practical Considerations Relating to the Use of Santobrite on Trays

(a) Since sterilising procedures for mushroom trays are usually carried out between each growing period prior to heat sterilising the trays in the peak-heat room, it was considered that an investigation should be carried out to determine whether any build-up of Santobrite would occur on the wood as a result of repeated dips.

Santobrite has now been in constant use at the mushroom farm where the preliminary trials were carried out, for 12 months, during which time some of the trays have been treated with Santobrite solutions 4 or 5 times. No deleterious effects on the crops grown in these trays have been observed, indicating that in practice repeated dipping of the trays does not endanger the growth of subsequent mushroom crops.

It is considered, however, that where the same trays are used four or five times a year, it is not necessary to re-dip the trays after each crop since in such circumstances a Santobrite treatment of the trays between every other growing period provides quite sufficient protection against unwanted mould growths.

Laboratory investigations were also carried out to determine whether any build-up of Santobrite would result from repeated dips, by analysing the wood of trays, which had been treated a various number of times, to determine their Santobrite content.

The analyses were carried out by taking borings or sawdust from various points over a treated tray and analysing these chemically to determine the average concentration of Santobrite over the whole tray. From the mushroom farms participating in the trials, trays were obtained which had received one, two and three dips in 2% Santobrite solution between successive growing periods. The results found for percentage of Santobrite present on dry weight of the wood from these trays are given in Table II.

TABLE II

Treatment of tray. No. of dips in 2% Santobrite solution	% Santobrite found on dry weight of wood taken from tray
1	0.120
2	0.125
3	0.107

These results show that no significant build-up of Santobrite occurs on the woodwork of the trays as the result of repeated dips in a 2% solution. This is accounted for by the fact that during the growing period a proportion of the Santobrite initially on the trays is transferred to the compost actually in contact with the treated wood forming the thin barrier, previously referred to, at the edges of the compost.

(b) Whilst theoretically many agents could be used for sterilising the trays, they could quite easily prove detrimental to the mushroom mycelium and to the mushrooms themselves due to fumes, given off from the treated trays, filling the growing houses. In order to check whether there would be any tendency for this to occur in the case of Santobrite, the following test was carried out in the laboratory. A white mushroom was suspended in a bottle, in the bottom of which was a quantity of 2% Santobrite solution, so that it was not in direct contact with either the solution or the sides of the bottle. The mushroom remained completely free from staining or burning until it died off (several days). This indicates an absence of fumes given off by Santobrite itself, as no adverse effect was noted on the mushroom in this test.

It was found, however, that direct contact with Santobrite solution could cause burning of the top surface skins of mushrooms resulting in brown stains being produced. For this reason certain precautions must be observed when using Santobrite treated mushroom trays.

Precautions to be Observed Regarding the Use of Santobrite-treated Trays

Santobrite is a very potent fungicide and, as has already been pointed out, its presence in the compost immediately adjacent to the walls of the trays is sufficient to prevent the active mycelium in the body of the compost from penetrating to the woodwork. It has also been mentioned above that direct contact of Santobrite solution with the top surface skins of mushrooms can cause burning or staining. For this reason it is essential, for example, during watering of the trays in the growing houses to avoid, in so far as possible, heavy dripping of water from Santobrite treated trays on to the tops of mushrooms growing in trays below or on to the casing soil through which the pinheads have to penetrate. On the two farms where trials have been carried out the growers concerned consider the overall results obtained, following the use of Santobrite, to be so good that they are prepared to accept the need for a certain amount of extra care in this respect.

On one occasion a report was received that a crop delay had occurred following the use of Santobrite treated trays. Investigation revealed that while close-stacked in the peak-heat room the top surfaces of the compost in the affected trays had been allowed to come into direct contact with the treated wood forming the bottoms of the trays stacked above them. It was found that sufficient Santobrite had been transferred to the top layer of the compost to cause a temporary barrier to the healthy spawn in the body of the compost, thus delaying the breaking through of the spawn into the casing soil by a period of 1 to 2 weeks; the trays after this delay then cropped normally.

That such a delay can occur makes it essential that at any time after treated trays have been filled with compost and are close-stacked, the trays should be separated from one another by means of wooden pegs to prevent contamination by Santobrite of the top surfaces of the compost due to direct contact with the treated wood forming the bottoms of the trays stacked above.

Discussion :

Whilst at first sight it may seem strange to employ a fungicide for the treatment of trays in which mushrooms are to be grown, the trials described above have indicated that with due precautions, Santobrite solution can be employed for the sterilisation of mushroom trays without endangering the crops grown in them.

The advantages, such as the prevention of growth of disease fungi, increased cleanliness of trays, saving of time normally associated with the brushing out of trays between growing periods, and the control of *Cecid* larvae, which can be gained, can make such a treatment a real benefit to mushroom growers. Following the successful use of Santobrite over a period of 12 months on the farms participating in the trials, its use for the sterilising of mushroom trays can now be considered to have passed the initial proving period.

No doubt individual growers will wish to prove for themselves that successful results can be obtained under their own growing conditions, and for those who are troubled by mould growth on trays and by *Cecid* larvae infestations the results on the use of Santobrite, described above, should provide sufficient encouragement for such growers to pursue their own trials with this chemical for the sterilisation of their mushroom trays.

MOUNT

MUSHROOM SPAWN

Washington,
Pulborough, Sussex.

J. E. R. Simons Ltd.,
Harlow,
Essex.

23rd Feb., 1957.

Dear Sirs,

I have great pleasure in sending you this photograph of mushrooms. The spawn is Mount Enve (Grain). It is a first flush, and produced 1 lb. per square foot in seven days. Since then the second flush produced 2/3 and the third flush which is now on looks just as promising. But this is not my first crop that has done so well as this; I have had many which have given me 3 pounds per square foot—and 4 pounds on outdoor ridge beds—all with Mount Enve. My father, Ernest Lee, of Broadwater Lane Nurseries, Copsale, Horsham, has, as you most probably know, the same results.

My compliments to you for producing this strain of spawn.

Yours sincerely,

Cecil Lee.

RELY ON — THE BEST



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Recently **Dr. Robert Bull**, Agent in Marketing, Extension Division, University of Delaware, contributed an excellent article to this publication about pre-packing in the United States. More recently he had made a notable contribution to the problems facing the mushroom industry in America and since, in the opinion of The Editor, these problems have their counterpart in this country, part of Dr. Bull's talk is reproduced herewith, by permission of "A.M.I. News," Swayne-Campbell-Testa Post, V.W.F., Kennett Square, Penn.

HOW TO MAINTAIN A PROFITABLE MARKET

Dr. Bull, after first expressing his pleasure at meeting the Pennsylvania-Delaware mushroom growers again, pointed out that, before the war the American public spent 17% of their income on food. Since the war and allowing for vastly increased income this figure spent on food amounted to 25% although, by still spending 17% of the present income, living standards could have been maintained at pre-war level. Dr. Bull later said:—

Mushrooms, both fresh and canned, are still a speciality product. The demand varies greatly according to supply and price. In comparison to staple foods, like potatoes and sugar, the demand for mushrooms is quite limited. Like other speciality products with a limited demand *only a small change in the volume marketed can cause a major change in price*. Here is a simple illustration which shows this relationship clearly: last month on the Philadelphia produce market the equivalent of 25 carlots of mushrooms were received. They sold for an average price (for good quality not including specials) of \$1.54 per basket. In January, 1956, when the receipts were slightly higher, equal to 27 carlots, the price averaged only \$1.28. And in the relatively poor season the year before, 31 carlot equivalents were marketed there in January and the price average was only \$1.22. Profits, then, are gravely endangered by sizable increases in the volume of mushrooms marketed.

As far as individual growers are concerned, now, there are only two ways to make more money. The first, of course, is to sell more mushrooms when the prices yield a profit—to expand production facilities by building more houses. The second way is to cut production costs—to grow the mushrooms cheaper. This year I suspect that many of you may have a little bit of additional capital you might like to invest in your mushroom business. You will have to decide whether to build another house or to invest in improvements and labour-saving equipment to cut costs. Which investment will yield the biggest profit, and which will be safer?

Many variables of management ability and individual skill as a grower enter into the answer to the first question. Theoretically, though, in an industry like this with its many opportunities for further mechanization and for work simplification, **the opportunities for cost cutting deserve fully as much attention as opportunities for expansion**. There is little question but that investments to reduce costs are generally safer than investments to expand production facilities. Here I am talking about more efficient compost turners and handling facilities

for example, or an improved packing house operation that will minimize the labour costs per unit.

If individual growers should concentrate on building more houses instead of making improvements to cut costs, additional supplies of mushrooms could easily surpass the growth in demand. Prices may well decline as they did in the 1954-55 season. Production costs would be essentially the same, so profits definitely would be squeezed.

On the other hand, when additional capital investment goes for improvements that will increase efficiency, production costs will be down and these growers will be better off profit-wise, regardless of the price level, than those who directed their efforts solely to building more houses. Dangers of overexpansion compel us to give very serious consideration to possible investments to cut costs in preference to additional growing space. Of course, some additional houses can and should be added to our total production facilities, but as we pointed out a year ago, caution is essential to the long-term welfare of the industry.

Before leaving the subject of reducing costs, I want to mention that all of the improved production and disease control methods that increase yields also reduce the per-unit production costs, and that is why the production research, such as Penn State is doing, is of such vital importance to the stability and profitability of the industry. In addition to production and marketing research, there is a great need for research to determine which methods for handling compost, harvesting and packaging are the least costly. We hope that the marketing research work at the University of Delaware will get into some of these questions about harvesting and packaging in the near future.

In my remaining few minutes, I would like to talk about the course of action that the mushroom industry as an organization will take in the coming year. It is perhaps the major function of the A.M.I. to conduct a continuous promotional campaign, and the industry as a whole can hardly overestimate the importance of this effort. Mushrooms can be sold on their own merits quite easily, but all too few of our nation's consumers are at all familiar with the economy, ease of preparation and flavourfulness of our product. Unlike most commodity trade organizations, the mushroom industry actively entered into promotional competition for the consumer's dollar late in the game, less than two years ago. Tremendous strides have been made, but there is still a big job ahead of us.

We talked a little earlier about the rising level of consumer incomes. Consumer spending this year is expected to rise to \$285 billion from the \$266 billion of last year. More than 51 per cent. of all U.S. families now have incomes in excess of \$5,000 per year. Twice as many people make 5 to 10 thousand dollars as in 1950; twice as many earn over 10 thousand as in 1950. To-day **8 per cent.** make over 10 thousand each year. The trend is progressing upward all the time.

These figures do not mean that more money will come **automatically** to the mushroom industry through increased sales. In fact, these consumer dollars have to be competed for not only among the different food products but also between foods and non-foods. In 1957 we will

witness the sharpest battle for this consumer income that we have seen yet. It will be fought largely on the front of advertising and promotion. Members of the mushroom industry can meet the competition and continue to grow and prosper only by working together in support of its promotional programme. Even related business firms that are largely dependent upon the mushroom industry have much at stake in this effort and their support also is important. The job is not an easy one even when the A.M.I. enjoys the best of co-operation. The amount being invested in promotional efforts on behalf of mushrooms is only a modest sum. The industry might well face the necessity for increasing its advertising and promotional budget to compete effectively with other goods and services. To-day some \$10 billion are being spent annually for advertising and promoting the gross national product of \$412 billion worth of goods and services. Or, stated another way, 2.4 per cent. of the income from all U.S. goods and services is reinvested in advertising and promotional efforts. This total compares to two-tenths of 1 per cent. being spent for promotion and advertising by the mushroom industry through both the A.M.I. and the Mushroom Cannery League. These two groups spend about \$40,000 yearly to promote and advertise our 25-million-dollar mushroom industry. If you add to these promotional budgets a liberal estimate of the amount spent by private canners for advertising mushrooms, the total still does not exceed 1 per cent. of the value of the product.

Let's compare this figure of two-tenths of 1 per cent. spent by the A.M.I. and the M.C.L., or even the 1 per cent. figure which includes canners' ads as well, with a few of the basic industries competing for the consumer dollar.

1. The food industry as a whole spends 1.08 per cent. of each dollar for advertising and promotion.
2. The tobacco industry spends 4.41 per cent. of each dollar for advertising and promotion.
3. The alcohol industry spends 5.80 per cent.
4. The auto industry spends 1.09 per cent.

Suppose we take a closer look now at some of the individual budgets in the food group. The promotion and advertising budgets which follow are those of trade associations and do not include expenditures of private firms.

Advertising and promotion Budget		Budget as Per Cent. of Gross Sales	
		Gross Sales	Gross Sales
Dairy Industry..	\$9,000,000	\$4,212,000,000	.21
Florida Citrus ..	5,000,000	233,000,000	2.10
Livestock Industry ..	5,500,000	9,500,000,000	0.6
Wash'ton State Apples	1,000,000	72,000,000	1.40
Mushroom Industry ..	40,000	25,000,000	.20

We do not want to forget either about the non-food items that also compete for the consumer's dollar.

Revlon Cosmetics, for example, are marketed with a promotional and advertising budget of £ 8 million or 200 times the amount being spent on mushrooms by the A.M.I. and the M.C.L. combined.

Lever Brothers spend \$2 million each year just for Pepsodent Toothpaste and brushes. Three million dollars is spent on Parker Pens and Pencils. One hundred twenty-five million dollars is spent on soft drinks. The Puritan Sportswear Company raised its budget for promotion and advertising by 350 per cent. in 1955 and increased sales by 35 per cent. Six out of every ten advertisers in the United States will spend more during the first half of 1957 than in the corresponding period last year, a recent survey shows.

DO YOU KNOW that in the first four weeks of the MGA Publicity Bag Scheme **HALF A MILLION BAGS WERE SOLD !** Have **YOU** asked for your **500** for distribution ?

EIRE FARM VISIT

Already some 20 MGA members have signified their intention of paying a visit to Irish Nurseries Ltd., Kimmage Road West, Dublin, on Saturday, 25th May. If you intend going let the MGA Secretary know without delay. The tour of the nurseries and mushroom houses will commence at 2.30 p.m. sharp.

MORE MONEY FOR PUBLICITY

Additional subscriptions to the MGA Publicity Fund last month (to 24th April) are listed below and are gratefully acknowledged by the Publicity Committee. If you are seeking a fresh salesman, if you are purchasing spawn and any sundries remember those who, by their support are making this MGA Publicity Campaign possible.

***Spawn Makers:**

†H. Mount & Sons Ltd., Littlebourne, Canterbury.

†S. A. F. Sampson Ltd., Oving, Chichester, Sussex.

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WORLD'S PRESS DIGEST

Items relating to the mushroom industry in Pennsylvania: Crop value at wholesale prices 15,000,000 dollars; number of establishments 600; square feet of plant facilities 23,781,000; total production in pounds 47,600,000; total investment \$35,000,000; wages and salaries \$7,000,000. *AMI News*, February/57.

The argument that the annual mushroom production in Pennsylvania is 15,000,000 dollars, only three million dollars below the State's total value of commercial vegetables, is one of a number advanced to support the request for a 100,000 dollar appropriation to erect, equip, staff and maintain a mushrooms experiment house at Pennsylvania State University. *AMI News*, February/57.

A mushroom war between mushroom canneries has caused quite a situation in New South Wales. One cannery, it seems, is trying to corner stable manure According to the N.S.W. Vegetable Growers' Association, the cannery has also taken over a spawn producer, and is "using this as a lever" to tie up mushroom growers. *Grower*, March 30/57.

Germany is allowing imports of dried mushrooms from Britain.

Grower, March 30/57.

Twice in recent months I had to complain to mushroom growers of short weight, as much as $\frac{1}{4}$ lb. per 3 lb. chip in one case, after consistent similar deficiency. H. Ososki in *Grower*, March 30/57.

Lighter arrivals this week both cups and buttons being in excellent condition. *Fruit Trades' Journal*, March 30/57.

There are many who hold that the proceedings of small specialised conferences should not be published. The great advantage of such meetings is that it allows scientists to "stick out their necks." The prospect of appearing in print is likely to inhibit this completely. L. J. Audus in *Nature*, March 30/57.

Some air movement (in the mushroom house) is essential. Complete stagnancy spells all sorts of trouble. A blast of air makes the poor sporophores peel with dismay—and you ought not to peel cultivated mushrooms A compromise between complete removal of noxious gases and optimal evaporational stimulus is indicated but, unfortunately, no independent study of the conditioning of mushroom houses in this country has been undertaken or, at least, published.

Fred. C. Atkins in *Nurseryman & Seedsman*, March 21/57.

Diurnal variations in outdoor air temperature, wind velocity and intensity of solar radiation cause a diurnal variation in the rate of heat flow into or out from a building. This variation is strongly influenced by the heat capacity of the structure and the ventilation rate. Thus it is difficult to estimate accurately the loads on heating and cooling systems or to predict the indoor climate of buildings not provided with such systems.

G. V. Parmelle in *Bulletin of the American Meteorological Society*, 36 (6), 1955.

Good control of *Ditylenchus dipsaci* eelworm was obtained by spray or drench applications of OS1836 on alfalfa and with Systox and OS1836 on daffodils.

G. B. Bergeson, in *Plant Disease Reporter*, 39 (10), 1955.

Telone, containing approximately 95% dichloropropene, is recommended as a general nematocide. F. W. Fletcher in *Down to Earth*, 12 (2), 1956.

Though successful results have been reported in Southern Rhodesia with high-voltage, non-thermal electrical treatments for control of root-knot eelworm, the present research indicates it is impractical.

B. Lear and F. C. Jacob in *Plant Disease Reporter*, 39 (5), 1955.

Some 24 million Americans have been using artificially fluoridated public water supplies for varying periods—willing or unwilling guinea pigs in what many American scientists and most Europeans regard as a huge and possibly disastrous nationwide experiment.

Dr. F. B. Exner & Dr. C. L. Wadsworth in *The American Fluoridation Experiment*, (Devin-Adair), 1957.

Once you have mastered a single method of getting a good crop be slow to change it, and beware of too many large-scale experiments.

Robert Patterson in *Commercial Grower*, March 15/57.

Large quantities of gas liquor, perhaps equivalent to 50,000 tons of nitrogen, are produced each year by the British gas industry, and at present only a small proportion of this is used in agriculture.

J. Webber in *Agriculture*, March/57.

I think it may be said that the best advertisement for apples is a good apple. Low-grade apples tend only to reduce the price, and no amount of publicity will help the grower of such fruit.

W. S. Hudson in *Grower*, March 23/57.

Mothering Sunday? She would rather have mushrooms—and so would you.

Personal Column in *Daily Telegraph*, March 26/57.

Earlier work suggested that a standard calcium oxalate crystal count, called the phloem index, was indicative of the K/P balance in the tea plant. Further investigations suggest that calcium oxalate crystal frequency appears to be a sensitive quantitative index of metabolic changes associated with nutrient uptake.

D. N. Barua in *Current Science*, 25, 1956.

Dipping field boxes in Cellu-san, which contains a non-toxic fungicide and a water repellent, protects them against rotting and mould growth and reduces repair costs.

American Vegetable Grower, 4 (8), 1956.

"I believe in giving the maximum opportunity for men to earn above-average wages, and that the best way to do this is by working as much piecework as possible," said Mr. John Young, who farms 760 acres. "I do not believe in bonuses paid on farm profits; they are too indirect and too slow, and tend to be regarded as a gift."

Agriculture, March/57.

The total cost of steam sterilizing compost for cucumber and tomato beds was reduced by about 40% by using drainage pipes. The pipes, of 65 mm. diameter, were spaced at about 0.4 m. each way in the heap which was covered with straw mats; the steam was blown into the pipes for six hours.

G. Vogel in *German Gardening* (Dtsch. Gartenb.), 3, 1956.

For a number of years the Port of Bristol Authority have eliminated coins from their wages procedure. The weekly pay of each employee is made up to the nearest 10s. above the amount which is due to him The difference is taken into account when the following week's pay is computed If a payroll is rounded-off in this way, there are substantial savings in the work of drawing and handling cash, making up pay packets and checking the amounts. *Business*, April/57.

Using surface applications of xylene emulsions on breeding media, laboratory applications of 5 mg. diazinon per sq. ft. gave better than 90% mortalities of small, medium and large house-fly larvae.

Donald A. Lindquist and R. W. Fay in *Journal of Economic Entomology*, 49 (4), 1956.

Various commercial chlorophyll preparations were tested against 11 species of Gram-positive and Gram-negative bacteria. The water-soluble preparations inhibited bacterial growth only in high concentrations (10% chlorophyll and higher).

I. Strutz in (German) *Pharmazie*, 10 (12), 1955.

A discussion on the control of plant diseases by the use of antagonistic organisms is restricted to disease caused by fungi. Antagonism is interpreted as an activity of an organism that adversely affects another growing in association with it. The conclusion is that the antagonists in the control of disease are not likely to compete with ordinary fungicidal treatments except in isolated cases under special conditions.

R. K. S. Wood & M. Tveit in *Botanical Review*, 21 (8), 1955.

The RUVO mushroom farm at Hardtgasse on the outskirts of Vienna has 18,000 sq. ft. in one old beer cellar and 63,000 sq. ft. in another, all in ridge beds. Air ventilation is a big problem and is probably responsible for the rather low yield compared with our own being equivalent to 1 lb. per sq. ft. This is about the same as production in Belgium, but is very low when compared with the $1\frac{1}{2}$ lb. per sq. ft. obtained in seven weeks at Dr. Hauser's modern farm at Gossau-Zurich, in Switzerland. Temperatures in the caves average 52-57°F.; consequently the mushrooms grow rather more slowly and are very heavy. They average about $1\frac{1}{2}$ inches in diameter and are picked complete with stalk and butt; this tends to prevent drying out and loss of weight. The beds are left for almost a whole year before being removed. (The best part of two pages is devoted to revealing the secret of how to grow this pound to the square foot on ridge beds in almost one year).

Major A. L. A. Dredge in *Grower*, March 16/57.

References:

- Agriculture*, H.M.S.O., York House, Kingsway, London, W.C.2.
AMI News, 20 West State Street, Avondale, Pennsylvania, U.S.A.
B. & G. Review, 27 St. James Street, Covent Garden Market, London, W.C.2.
Business, 109/119 Waterloo Road, London, S.E.1.
Commercial Grower, 154 Fleet Street, London, E.C.4.
Digest of Equipment, 3 Cranston Drive, East Didsbury, Manchester 20.
Food Investigation, H.S.M.O., York House, Kingsway, London, W.C.2.
Fruit Trades' Journal, 6/7 Gough Square, Fleet Street, London, E.C.
Grower, 49 Doughty Street, London, W.C.1.
Mushroom News, W. Darlington & Sons Ltd., Southcourt Road, Worthing, Sussex.
Nature, Macmillan & Co. Ltd., St. Martin's Street, London, W.C.2.
Nurseryman & Seedsman, 62 Doughty Street, London, W.C.1.
Produce Packaging, Agriculture House, Knightsbridge, London, S.W.1.
Transactions of the British Mycological Society, Cambridge University Press, Bentley House, London, N.W.1.

If the journals referred to are generally available, they are most easily obtained by placing an order with your bookseller or stationer.



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FIT FOR KINGS AND ALL MANKIND

A short time ago, Mr. Raymond Thompson, of Church Farm, Wittering, Chichester, put an advertisement in the *Bognor-Chichester Observer* which read, "Female mushroom pickers required" and, as frequently happens in cases such as this, the matter was immediately taken up by one or two readers of the paper and some amusing correspondence and verse resulted.

The happening also once again pin-pointed the value of publicity for the cultivated mushrooms for, says Mr. Thompson, "in the following week my local demand practically doubled and even after a week or two the demand remained considerably higher than it was previous to this correspondence."

The Bulletin is indebted to the Editor of the *Bognor-Chichester Observer* for permission to publish and to Mr. Rowden for an additional and quite delightful contribution.

Following the appearance of the advertisement came this initial effort from Mr. Rowden, of Tudor Lodge, Barrack Lane, Aldwick :—

Some "Female Mushroom Pickers" someone needs,
For that is how a local "advert" reads.
This wording may perhaps some folk perplex
And wonder which is which of female sex.
For a picker may be female, but a mushroom they don't know
If it has to have a mushroom mate to make more mushrooms grow.

E. E. Rowden.

Copy of letter from Raymond Thompson, to Mr. Rowden:—

I trust that this little gift will convince you that my mushrooms are entirely feminine. (A gift of mushrooms was enclosed.)

Copy of Mr. Rowden's reply :—

Thank you for your gift which is very much appreciated. You will see from the following few lines that I am now duly convinced:—

Your gift of the edible fungus,
By their elegant shape and plush bloom,
Delectable morsels so wondrous
Can be nought but the female mushroom.

In the next issue the *Bognor-Chichester Observer* followed up with:

Your correspondent Mr. Rowden seeks to cast doubts upon the sex of my mushrooms.

Surely their delicate skins and delightful curves proclaim their femininity?

Raymond Thompson.

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grain spawn

produces abundant crops

of high quality mushrooms

AVAILABLE AT COMPETITIVE PRICES

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GEO. MONRO LTD.

HERTFORD ROAD, WALTHAM CROSS, HERTS.
*and at Aylesford, Worthing, Cheltenham,
Gt. Totham, Penzance, Spalding, Swanwick*

and the following two letters duly appeared also:—

For your correspondent, Mr. E. E. Rowden's, edification:—

The Mushroom, delicate and pale,
Has long since sought to mask its gender
By wearing o'er its spores a veil
To hide them from the knowing spender
Who seeks to lure, with drooling lips,
The tasty morsel, with some bacon,
On to a plate heaped high with chips
And thus his appetite awaken.
But as the gourmets munch with relish,
Do they realize there is no suitor
For lonely mushrooms? Isn't it hellish!
The poor things happen to be neuter!

M. Bulloch,
The Cottage,
New Road,
Littlehampton.

About those mushrooms, obviously they are "male," because they are "big-headed" and quite bald.

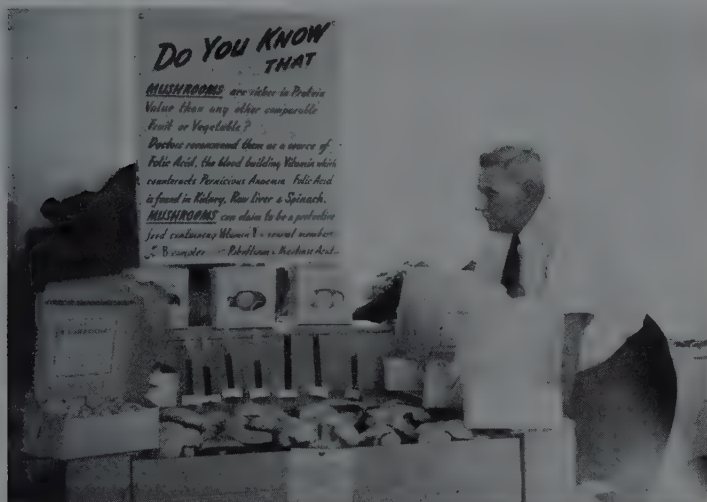
(Mrs.) Elizabeth Redding,
Keepers House,
Boxgrove Common,
Chichester.

And finally, to the *Bulletin*, Mr. Rowden writes:—

THE EDIBLE FUNGUS

The mushroom once was only wild
Not cultured—just a nature's child.
Born in meadows, there it grew
Bathed in early morning dew,
There to be picked by all who pass
From dewey bed of meadow grass.
Oh mushroom wild, kissed by the dawn,
Offspring rising from its spawn
Untouched by science or a grower,
But is its status any lower?
When 'tis cultured and embellished
Is it more then, to be relished?
Modern ways and science both
Aid it in its virgin growth,
With such tender care 'tis treated
And its beds just rightly heated.
Then, gathered, trimmed, and with a brush
'Tis dusted to reveal its plush,
The grower's joy the buyer's find
Fit for Kings and all mankind.
Such great demand needs mass production,
To nature, this is sheer seduction.

PUBLICITY PICTURES FROM OVERSEAS



Seen above is Mr. C. M. Hulley of Umtali, S. Rhodesia, MGA Member, with his exhibit of mushrooms which gained a first prize at the Royal Show, Salisbury. The exhibit, described as "very fine" and "quite impressive" shows mushrooms growing in a tray, graded and pre-packed, test tubes showing the growth of spawn from mycelium to a tiny mushroom and the poster setting out the mushroom in all its virtues.



Picture on the left is of a Dublin shop window. Mushrooms for this attractive display were supplied by Irish Nurseries Ltd. (Mr. Groom).

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The picture above, supplied by Major A. L. A. Dredge, of Sundridge, Kent, shows a new type of container to take 2-3 lb. of mushrooms and designed especially for taking mushrooms from the packing shed direct to greengrocers and hotels. Writes Major Dredge: "It should be clearly understood that these cardboard trays are not designed to stand a journey either by rail or road to markets and are not intended to be covered. The cost, when ordered by the thousand, works out at around 3½d. each and the makers are HUNT PARTNERS LTD., Theydon Road, Clapton, E. 5."

In America

MUSHROOM INDUSTRY SHORT COURSE

The Second Annual Mushroom Industry Short Course of the College of Agriculture, The Pennsylvania State University, will be held 24th to 27th June, 1957, on the Penn., State Campus.

The course is designed to help commercial mushroom growers and those in related fields to keep abreast of the most recent developments in the industry. Included will be phases of nutrition, development, pathology, animal pests of the crop, and marketing of mushrooms on a commercial scale.

A programme is also being arranged for the wives who accompany their husbands. Tentative plans include visits to an all-water cave, tour of the Columbus Chapel and Museum, demonstrations on flower arrangement, and the like. A fee of \$2.50* will be charged for transportation; fees charged for entrance to the cave and museum are additional!

Rooms for men, women, and couples are available on the campus.

The fee for the course is \$10.00* for Pennsylvania residents and \$15.00* for non-residents.

Persons 16 years of age or older are eligible for enrolment in the course.

Additional information and application blanks may be secured from Dr. Fred C. Snyder, Acting Director of Short Courses, College of Agriculture, The Pennsylvania State University, University Park, Pennsylvania, or from the MGA Secretary, Agriculture House, Knightsbridge, London, S.W.1.

*1 dollar equals approximately 7/1½d.--Ed.

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 Geo. Monro Ltd., Hertford Road, Waltham Cross.
 Pinkerton's Scottish Mushroom Laboratories, Millerston, Glasgow.

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SEEN THIS ?



Of particular interest to mushroom growers is the range of high pressure steam cleaners now being marketed by the Weaver Manufacturing and Engineering Co. Ltd., of Magna Works, Bedford (Tel. Bedford 5311).

It is claimed that this range of steam cleaners, one of which is pictured above, work on the ordinary household water heater principle, consisting basically of a combination fuel and water pump delivering water to a generating coil and fuel oil to a burner positioned centrally in the coil. Cold water in the coil is heated to 270° F. within a minute.

An experiment carried out with one of these heaters took place in a mushroom house 60 ft. long by 15 ft. wide, using the steam jet and a stack pipe leading from the cowl of the steam cleaner to a point 3 ft. inside the house. The temperature inside the house was raised from 78° to 147° in 3½ to 4 hours, the makers claim. This temperature was easily maintained for a period of 48 hours by short "boosts" when required.

MGA member who uses a Heavy Duty Universal, Two Gun Weaver Steam Cleaner is Mr. J. A. Scrimgeour of Crossways, Pimperne, Blandford, Dorset, who has tested it out on house heating, on steam cleaning trays and on sterilizing peat. He says, "It made a first-class job and it also cleaned the floor of the compost shed as clean as a whistle. I am delighted with it—its efficiency is quite remarkable."

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1 lb. 15/6, 7 lb. £5 1. 6, 14 lb. £9 16. 0,
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For dusting use 8-12 oz. per 1,000 sq. ft. Apply after casing and give 2 further dustings between breaks. Alternatively use 4 oz. per 1,000 sq. ft. for regular weekly applications.

7 lb. £1 6. 3, 14 lb. £2 10. 2,
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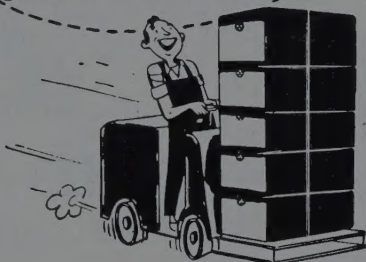
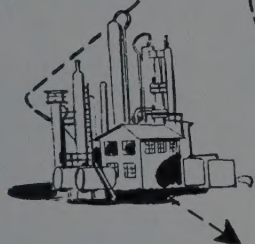
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FOR SALE: Mushroom Farm, close Reading border, 20,000 foot, Tray system, hot water heating thermostatically controlled Peak heat hot water and steam. £5,500 or three yearly instalments. Write in first instance **F. C. R. WIGGINS**, Campestri House, Tokers Green, Nr. Reading.

REPRESENTATIVE required by Fertiliser Manufacturer for Southern Counties. Car supplied and Expenses paid. Connection with Horticulturists and Mushroom Growers preferred. Also sound technical or practical knowledge. Apply Box No. 8.

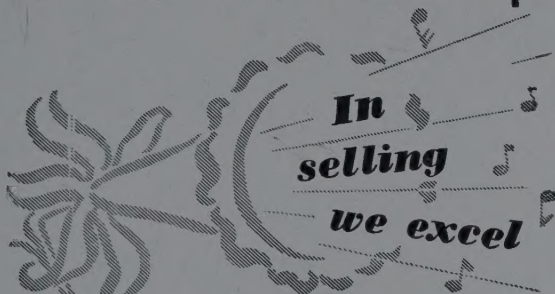
CORRUGATED sheets, steel or asbestos, can usually be supplied from stock by **COOPERS**, Builders' Merchants, Ashford and Canterbury. Also Drive Screws, Hook Bolts and Washers.

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